DEGRAY CREEK BRIDGE
Arkansas Bridges 2005
Spanning DeGray Creek at Blish Road (CR 50)
Arkadelphia vicinity
Clark County
Arkansas

HAER AR-81
AR-81

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

DEGRAY CREEK BRIDGE

HAER No. AR-81

Location:	Spanning DeGray Creek at Blish Road (CR 50), Arkadelphia vicinity, Clark County, Arkansas
UTM:	15.485203.3779254, DeGray, Arkansas Quad.
AHTD #:	11085
Structural Type:	Pratt pony truss
Construction Date:	Possibly c.1915; moved c.1970
Builder:	Unknown
Owner:	Clark County, Arkansas
Use:	Vehicular bridge
Significance:	The American practice of using pins for bridge connections lasted from the 1860s until the 1920s. DeGray Creek Bridge is the only known surviving pin-connected Pratt pony truss bridge in Arkansas. It was moved from its original location to its present location during construction of DeGray Dam in the mid-twentieth century.
Project Information:	The Arkansas Historic Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program that documents historically significant engineering sites and structures in the United States. HAER is administered by the Heritage Documentation Programs Division of the National Park Service, United States Department of the Interior, Richard O'Connor, Manager. The Arkansas State Highway and Transportation Department sponsored this project. Lola Bennett, HAER Historian, 2007

Chronology

1803 Louisiana Purchase doubles size of the United States

1818 Clark County formed

1819 Arkansas Territory created from part of Louisiana Purchase.

1836 Arkansas becomes 25th state to enter the Union

1844 DeGray Creek appears on Morse & Breese's map of Arkansas

1844 Pratt truss patented

1850 First all-metal Pratt truss constructed for the Pennsylvania Railroad

1873 Arkansas Legislature authorizes counties to build and maintain bridges

1907 Clark County begins erecting steel bridges

1915 Clark County purchases three 60' pony truss bridges

1950 River and Harbor Act authorizes DeGray Dam Project

1954 Blish Road (CR 50) appears on General Highway Map of Clark County

1964 Caddo River diverted around future site of DeGray Dam

1966 Excavation begins at future site of DeGray Dam

1969 Regulating dam completed

1970 DeGray Dam completed

DeGray Lake begins to fill

1971 DeGray Lake completed

1972 Clark County seeks federal funds to rebuild Caddo River and DeGray Creek bridges

1973 Development of DeGray State Park begins

Description

DeGray Creek Bridge is a 61', single-span, pin-connected Pratt pony truss on concrete abutments. The trusses are 7' high and spaced 12' apart. The upper chords and inclined endposts are riveted, built-up 5-1/2" x 12" members, comprised of back- to-back channels connected by a solid plate on top and battens underneath. The lower chords are paired 3/4" x 2" eyebars, spaced 9-3/4" apart. The chords are connected by 4-1/2" x 11-1/2" built-up posts, comprised of four angles with lacing. Paired 1/2" x 2" loop-ended bars and single 3/4" diameter turnbuckle rods cross diagonally between the posts. The truss members are connected with 2-1/2" x 12" pins that pass through adjacent truss members and are secured at each end with nuts.

Three transverse 4-1/2" x 10" built-up floor beams hang from the lower pins using 6" x 21" hanger plates riveted to the ends of the beams. Eight lines of 4" x 6" I-section steel stringers are laid longitudinally on top of the floor beams. A wood plank deck is laid transversely on the stringers. There are 3'-wide running boards on the deck. The bridge is laterally braced below the deck with 7/8" rods crossing between the floor beams. Railings along the inside of the trusses are formed by 2" x 2" angles riveted to the vertical truss members.

History

The original date of construction for DeGray Creek Bridge is unknown, but physical attributes—in particular, the pinned connections—suggest that it dates to the early twentieth century. Clark County erected numerous steel truss bridges between 1907 and 1920, but county records contain few details regarding their locations. Only one entry has been found with enough information to possibly link it to this bridge. In November 1915, Clark County purchased three 60' steel bridges: one, costing $940, from Hope Bridge Company and two, costing $1,190 and $1,080, from Stupp Brothers Bridge & Iron Works.[1] Although the locations of those bridges are not recorded, the cost indicates that they were pony trusses and the length is consistent with the DeGray Creek span.

According to information contained in Arkansas Highway & Transportation Department files, the bridge was moved sometime around 1970 during the construction of DeGray Dam.[2] Undertaken by the Army Corps of Engineers in the 1960s, the $55 million DeGray Dam project was one of the largest projects in Arkansas to date. Besides flood control for the Caddo and Ouachita rivers, the project included provisions for hydro-electric power, industrial water supply and public recreation.

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[1] *Clark County Court Records*, Book M, 183. Although the design of steel trusses was standardized well before the twentieth century, it is sometimes possible to distinguish bridges built by different companies based on particular elements of their construction. An examination of extant bridges built by one, or both, of these companies could provide evidence to support the c.1915 date. Also, the Stupp Brothers Company of St. Louis, one of the oldest family-owned steel manufacturers in the United States, might be able to provide information about their bridge designs of the period.

[2] U.S. Army Corps of Engineers, *DeGray Lake, Arkansas, Caddo River: Construction History, Dam and Dike* (Vicksburg, Mississippi: USACE Vicksburg District, 1972).

The 1967 "General Highway and Transportation Map of Clark County" indicates the DeGray Dam site and what appears to be Blish Road, whether proposed, or laid out, between Old Military Road and Terrell Road.[3] The following year, about three miles south of the DeGray Dam, construction began on a regulating dam, which formed a basin, known as "DeGray Reservoir," or "Lower Lake," to regulate the river stage and serve as an industrial water supply. Current county maps indicate that, when filled, the southern tip of DeGray Reservoir inundated an existing county road that spanned DeGray Creek near the mouth of Caddo River.[4] That crossing is presumably the original site of the DeGray Creek Bridge.[5] No information has been found to confirm the date when DeGray Creek Bridge was moved and rebuilt at its present site, but it probably occurred around the time this project was completed in 1970.

Design

Civil engineer Thomas Willis Pratt (1812-1875) was born in Boston, where his father, Caleb Pratt, was a noted architect. After obtaining his secondary education in the public schools of Boston, he enrolled at the Rensselaer Academy (now Rensselaer Polytechnic Institute) in Troy, New York, where he studied architecture. After graduation, Pratt worked for the Army Corps of Engineers, building dry docks for the navy yards at Charleston, South Carolina, and Norfolk, Virginia. In 1833, Pratt was employed by the Boston & Maine Railroad, where he began designing bridges. The remainder of his career was devoted to engineering and supervising work for railroad lines in the Eastern Unites States.

During his career, Thomas Pratt patented several inventions, including a steam boiler and a method of ship hull construction. The patent he achieved notoriety for is a roof and bridge truss, patented in 1844. The Pratt truss reversed the configuration of the 1840 Howe truss, putting the shorter web members in compression and the longer web members in tension, which greatly reduced the chances of structural failure through buckling. Developed at a time when the structural action of trusses was just beginning to be understood, the Pratt truss was one of several truss types that heralded the transformation from empirical to scientific bridge design. Over time, the Pratt truss came to be favored for its strength and straightforward design; by the 1870s it was the standard American truss type for moderate railroad and highway spans and continued to be so well into the twentieth century.

The pin-connected truss was an American development, beginning in the early nineteenth century when wooden bridges were connected with trunnels (tree nails). In the mid-nineteenth century, the technology was adapted to iron bridges. One of the first iron bridges with all pinned connections was built at Phillipsburg, New York, in 1860. By the early 1880s, pinned connections were standard American practice. Riveted connections were introduced in the 1870s, but their use was a matter of debate for several decades. Riveted trusses were more rigid but more expensive to build than pinned trusses. In addition, riveted trusses required gusset plates, which increased the overall weight of the structure. By the 1920s, pins had, for the most

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[3] The road does not appear on the 1970 USGS DeGray Quadrangle.
[4] U.S. Army Corps of Engineers, "DeGray Lake," brochure (Vicksburg, Mississippi: USACE Vicksburg District, 2000).
[5] No conclusive information was found to confirm this at the Clark County Courthouse, but the Army Corps of Engineers Vicksburg District Office *may* have information.

part, been replaced by riveted connections, except for long spans, where pins retained their advantage due to ease of erection.

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